

REMARKS

Claims 1-16 are pending in this application. Non-elected claims 6-11 are withdrawn from consideration by the Examiner.

I. Interview

The courtesies extended to Applicants' representative by Examiners Sykes and her supervisor, Examiner Tarazano at the interview held May 6, 2009, are appreciated. The reasons presented at the interview as warranting favorable action are incorporated into the remarks below and constitute Applicants' record of the interview.

II. Rejection Under 35 U.S.C. §103

A. Claims 1-5 and 12

The Office Action rejects claims 1-5 and 12 under 35 U.S.C. §103(a) over U.S. Patent No. 4,489,129 to Shue et al. (hereinafter "Shue") in view of U.S. Patent No. 4,910,289 to Harris (hereinafter "Harris"). Applicants respectfully traverse this rejection.

Claim 1 requires that "a proportion of polyphenylene sulfide relative to the reinforcing fibers is 0.001 to < 0.01 percent by weight." As acknowledged by the Office Action on page 8, Shue does not teach or suggest such a feature. In fact, Shue discloses a curable PPS concentration that is an order of magnitude greater than that recited in claim 1. Despite its asserted disclosures, Harris fails to cure the deficiencies of Shue.

Harris discloses miscible poly(aryl ether ketone) blends that contain from about 98 to 99.9% by weight of a miscible poly(aryl ether ketone) blend, and from about 0.1 to about 2% of a poly(phenylene sulfide) (PPS). See Abstract. Thus, Harris discloses a proportion of PPS relative to the miscible poly(aryl ether ketone) blend is 0.1 to 2 percent by weight. However, claim 1 recites the proportion of PPS relative to the reinforcing fibers. Thus, the rejection is improper at least because Shue discloses a curable PPS concentration that is an order of

magnitude greater than that recited in the current claims and Harris does not disclose that the proportion of PPS is relative to the reinforcing fibers, as recited in claim 1.

Even though Harris states in the sentence beginning on line 16 of column 4, "[t]he discovery that such small amounts of the additive (< 2 weight percent) are effective in promoting fast crystallization rates was totally unexpected," this parenthetical of "< 2 weight percent" follows the clause "such small amounts of the additive," which clearly refers to the preceding sentence that discloses "from about 0.1 to about 2.0 percent by weight of poly(phenylene sulfide)." Nowhere does Harris teach or suggest any amounts of less than 0.1 wt% of PPS relative to reinforcing fibers. Thus, Harris cannot be reasonably considered to teach or suggest an amount of 0.001 to < 0.01 wt% of PPS relative to the reinforcing fibers. Therefore, the applied references fail to teach or to have rendered obvious, or establish any reason or rationale to provide "a proportion of polyphenylene sulfide relative to the reinforcing fibers is 0.001 to < 0.01 percent by weight," as recited in claim 1.

Additionally, in rejecting independent claim 1 under 35 U.S.C § 103, the Office Action contends "it would have been obvious to one of ordinary skill in the art at the time of the invention motivated by expected success to utilize the coating composition of Harris in place of the coating composition as disclosed by Shue." See Office Action, page 9.

However, as discussed below, the applied references provide no reason or rationale for one of ordinary skill in the art to expect that the blends of Harris would be appropriate for the high temperatures utilized in Shue and, thus, one of ordinary skill in the art would expect that the blends of Harris would flow off the reinforcements if the process disclosed by Shue was followed. Accordingly, for at least this reason, a necessary element of a prima facie case is absent.

Shue discloses that the polymer treated reinforcements are subjected to conditions sufficient to cure the polymer coating and that the cure is necessary because the

reinforcements are likely to later be subjected to high temperatures that could otherwise cause the polymer coating to flow off of the reinforcements. See Shue, col. 2, line 62-col. 3 line 19 (emphasis added).

The polymer-treated reinforcements are subjected to conditions sufficient to cure the polymer coating. For the purposes of our disclosure and claims the word curing is intended to mean any process whereby the molecular weight of the polymer is increased by either lengthening of a molecular chain or by crosslinking or by combination of both by, for example, supplying to the polymer a curing agent and/or sufficient energy (such as, for example, heat). The cure is necessary because the reinforcements are likely to later be subjected to high temperatures that could otherwise cause the polymer coating to flow off of the reinforcements. For example, high temperatures can be encountered when incorporating the polymer-treated reinforcements into the plastic or subsequently when the plastic is molded, extruded or otherwise processed. The polymer coating should be cured to the extent necessary to substantially maintain the coating on the reinforcement. It is important to note that a complete cure (i.e. no more lengthening or crosslinking possible) is not usually necessary. Any set of conditions sufficient to effect a suitable cure can be employed. With respect to poly(arylene sulfide) we recommend curing by subjecting the polymer to a temperature of at least about 450°F. in air. The higher the curing temperature the shorter the curing time need be.

Accordingly, one of ordinary skill in the art would recognize that Shue requires the use of curable polymers to maintain the coating on the reinforcement given the high temperatures encountered when incorporating the polymer-treated reinforcements into the plastic or subsequently when the plastic is molded, extruded or otherwise processed.

The Office Action provides no reason or rationale why the blends of Harris are curable and/or would not flow off the reinforcements of Shue. Harris even discloses that polymers, even crystalline polymers, exhibit excessive loss of modulus, strength and creep resistance above their Tg's. See Harris, col. 2, lines 37-51. Harris does not disclose that the blends may be cured after application to a reinforcement. Additionally, one of ordinary skill in the art would also recognize that the required curing of Shue will reduce the polymer

molecules' vibrational and rotational freedom and, thus, would limit the ability of the molecules to reorient themselves into a crystalline morphology and thereby making it impossible to achieve the unexpected "fast crystallization" and strength of the composition of Harris. At most, it appears that the Office Action may be taking Official Notice that the materials of Harris will behave identically to those in Shue, or basing the rejection on alleged inherent properties. However, the application of Official Notice or inherency is not established and thus is improper in this case. Therefore, there are evidentiary gaps in the rejection of independent claim 1 that are fatal to a prima facie case of obviousness.

Additionally, as discussed during the interview, Applicants respectfully submit that the argument regarding "cutting down on process steps," as mentioned on page 3 of the Office Action, lacks merit. During the interview the Examiners indicated that such an argument would not be repeated because, as argued by Applicant's representative, the number of steps are not reduced and there is still one step for the application of the coating and another step for the embedding of the coated reinforcing fibers into the matrix. Thus, there is no motivation for combining the references based on the alleged simplification of the process.

For at least all of these reasons, claim 1 and the claims dependent therefrom would not have been rendered obvious by the combination of Shue and Harris. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection.

B. Claims 13-16

The Office Action rejects claims 13-16 under 35 U.S.C. §103(a) over Harris. Applicants respectfully traverse the rejection.

Claim 13 recites, "[c]oated reinforcing fibers each comprising a reinforcing fiber and a coating, the coating comprising polyphenylene sulfide, wherein a proportion of polyphenylene sulfide relative to the reinforcing fibers is 0.001 to < 0.01 percent by weight." Despite its asserted disclosures, Harris does not disclose such a combination of features.

Harris discloses a proportion of PPS relative to the miscible poly(aryl ether ketone) blend is 0.01 to 2 percent by weight. However, claim 13 recites the proportion of PPS relative to the reinforcing fibers. Although Harris mentions in passing that the compositions may include reinforcing fibers (see column 22, lines 36-38), Harris fails to disclose what amounts of fibers may be used in its compositions, or provide any disclosure that would teach or have rendered obvious, or established any reason or rationale to provide a ratio of the weight % of PPS to reinforcing fibers, as recited in claim 13 (emphasis added).

The Office Action asserts that it would have been obvious to one of skill in the art at the time of the invention to optimize the amount of PPS based upon the teachings of Harris. However, Harris does not disclose any ratio of the weight of PPS relative to the weight of reinforcing fibers.

It is well settled that a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). Because Harris fails to recognize the particular parameter of "a proportion of polyphenylene sulfide relative to the reinforcing fibers," it would not have been obvious for one of skill in the art at the time of the invention to modify the teachings of Harris in the manner suggested by the Office Action and arrive at the subject matter of claim 13.

For at least these reasons, claim 13 and its dependent claims would not have been rendered obvious by Harris. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

C. The Claimed Invention Produces Unexpected Results

Independent claims 1 and 13 recite, in part, "coated reinforcing fibers each comprising a reinforcing fiber and a coating, the coating comprising polyphenylene sulfide, wherein a

proportion of polyphenylene sulfide relative to the reinforcing fibers is 0.001 to < 0.01 percent by weight." As described in the present specification at paragraphs [0004] to [0006], Examples 1 and 2, and the Table (see specification, page 10), the claimed coating having PPS relative to the reinforcing fibers in a content in the claimed range produces an unexpected improvement in the apparent interlaminar shear strength ("ILSS") and of the bending strength ("BS") of the composite material containing reinforcing fibers, as compared to a composite material containing reinforcing fibers lacking a coating containing PPS. Moreover, there is a maximum PPS content at which ILSS and the BS are optimized; above this maximum PPS content, a decrease in the ILSS occurs. Thus, it is clearly demonstrated that the claimed content of PPS relative to the reinforcing fibers is critical and produces unexpected results.

III. Rejoinder

Applicants also respectfully request rejoinder of withdrawn claims 6-11. PCT Rule 13.1 provides that an "international application shall relate to one invention only or to a group of inventions so linked as to form a single general inventive concept." PCT Rule 13.2 states:

Where a group of inventions is claimed in one and the same international application, the requirement of unity of invention referred to in Rule 13.1 shall be fulfilled only when there is a technical relationship among those inventions involving one or more of the same or corresponding special technical features. The expression "special technical features" shall mean those technical features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art.

Applicants respectfully submit that each of claims 1-16 share the following technical feature: coated reinforcing fibers each comprising a reinforcing fiber and a coating, the coating comprising polyphenylene sulfide, wherein a proportion of polyphenylene sulfide relative to the reinforcing fibers is 0.001 to < 0.01 percent by weight. Because there is nothing on the record that establishes that this technical feature does not define a contribution

which each of the claimed inventions, considered as a whole, makes over the prior art, unity of invention exists among claims 1-16.

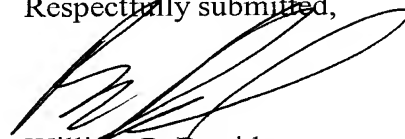
Accordingly, Applicant respectfully requests withdrawal of the restriction requirement and rejoinder of withdrawn claims 6-11.

IV. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of this application are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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